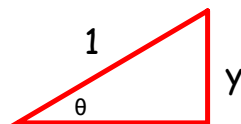
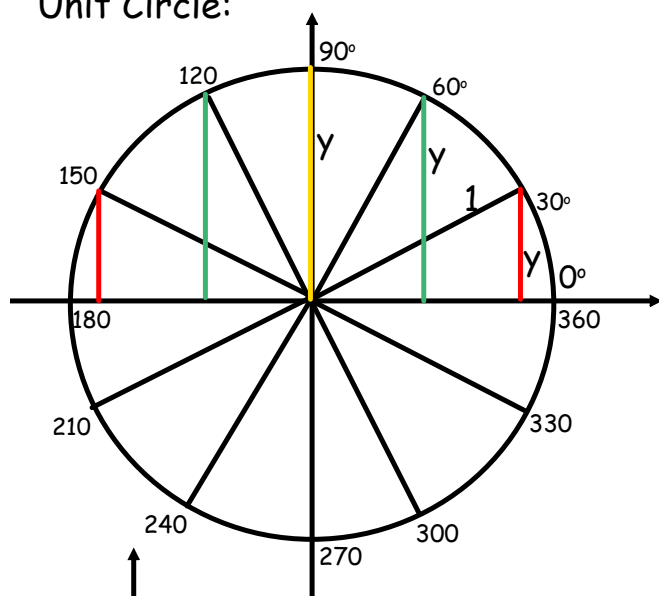
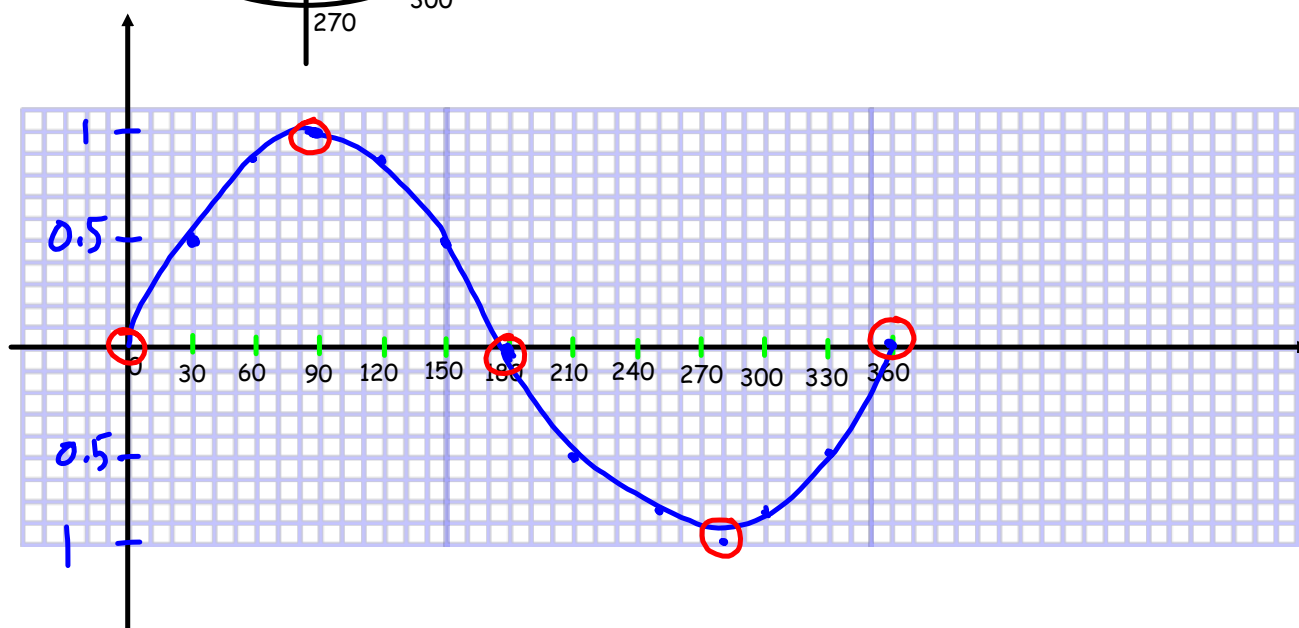


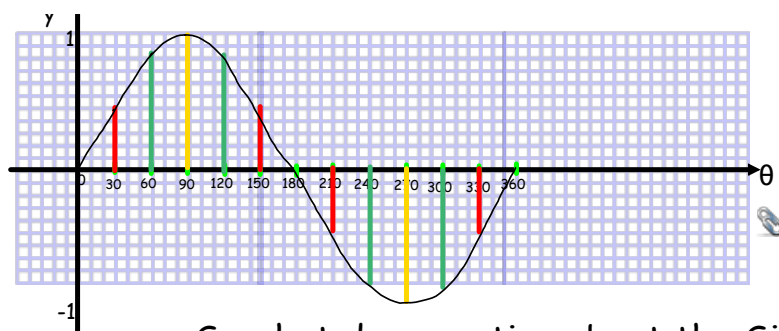
5.2 Investigating the Sine Function

Unit Circle:



$$\sin \theta = \frac{y}{1}$$
$$\sin 90^\circ = \frac{y}{1}$$
$$y = \sin 90^\circ$$
$$y = 1$$





Unwinding
the Unit Circle

So what do we notice about the Sin Function
 $y = \sin \theta$

Characteristics	$y = \sin \theta$
Domain	$D = \{ \theta \in \mathbb{R} \}$
Range	$R = \{ y \in \mathbb{R} / -1 \leq y \leq 1 \}$
Key Points	Key points: $(0,0)$ $(90,1)$ $(180,0)$ $(270,-1)$ $(360,0)$ Extra Points: $(30,0.5)$ $(150,0.5)$ $(210,-0.5)$ $(330,-0.5)$
Maximum Value	1 (peak)
Minimum Value	-1 (trough)
Equation of the axis	$y = \frac{\max + \min}{2}$ $y = \frac{1 + (-1)}{2}$ = 0
Amplitude	$y = \frac{\max - \min}{2}$ $y = \frac{1 - (-1)}{2}$ = 1
Period	360 °

Define Sinusoidal Function:



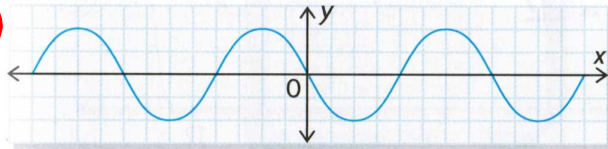
A type of periodic function created by transformations of $f(x) = \sin x$

Ex 1: Let's try p 339 #1:

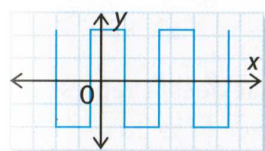
Which graphs are sinusoidal?

1. Which graphs are sinusoidal functions? Justify your decision.

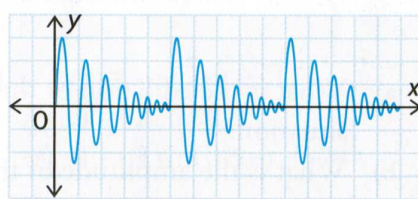
a)



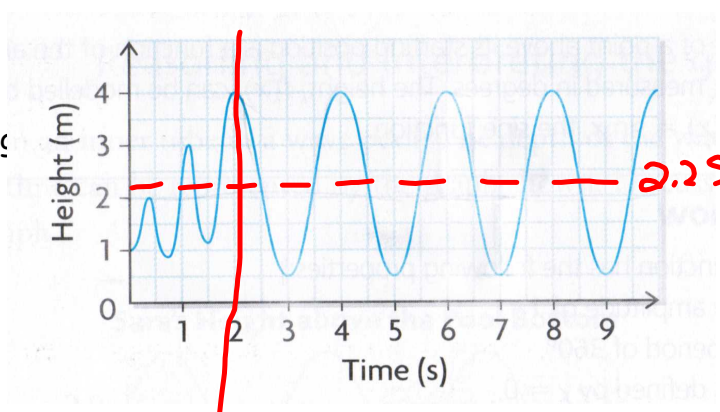
b)



c)



Ex 2: Nolan is jumping on a trampoline. The graph shows how high his feet are above the ground.

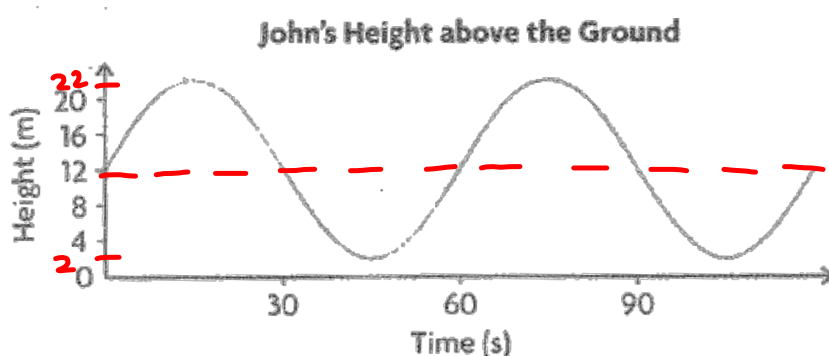


- a) How long does it take Nolan's jumping to become sinusoidal? 2 secs
What is happening during these first few seconds?

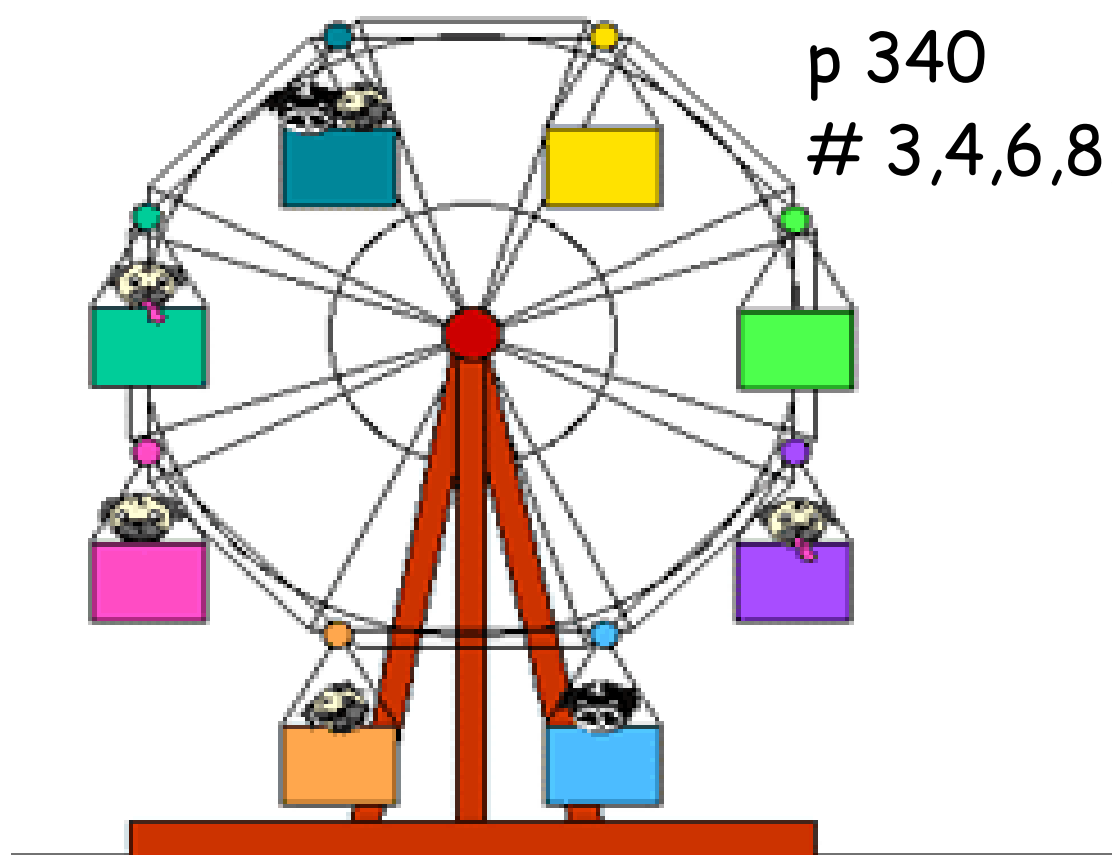
for the following questions refer to the sinusoidal portion of the curve

- b) What is the period of the curve? 2 secs
What does the period mean in this context?
the time it takes to make one full jump
- c) What is the highest Nolan is off ground while on the trampoline? 4m
This is the peak of the curve.
- d) What is the closest Nolan comes to the ground while on the trampoline? 0.5m
This is the trough of the curve.
- e) Write an equation for the axis of the periodic portion of the curve. $f(x) = 2.25$
What does it represent in this situation?
Half way between the highest and lowest point.
- f) What is the amplitude of the curve? 1.75m
What does the amplitude mean in this context?

Ex 3 The graph shows John's height above the ground as a function of time as he rides a Ferris wheel



- a) What is the Diameter of the Ferris wheel? 20m
- b) The radius of the wheel is the 10m of the curve.
- c) How high above the ground is the axle of the wheel? 12m
- d) What is John's initial height above the ground? Explain.
12m - gets on the ferris wheel (starting point)
- e) What is the closest John comes to the ground while on the ride?
2m.



Hmwk
p 340
3,4,6,8,10

unwind unit and transformwaves.GSP